There are a number of diseases of the nervous system, which are traditionally considered “neurological” or “therapeutic.” This is a fairly large group of diseases such as chronic pain syndromes, Parkinson’s disease, essential tremor, torsion dystonia, some forms of multiple sclerosis, epilepsy, phantom limb pain, syringomyelia, cerebral palsy, multiple impact injuries of the brain and spinal cord, etc. For a long time, all these diseases have been treated only by conservative methods. Patients with impaired movement, severe pain, sometimes leading to suicidal attempts of patients, gross violations of pelvic functions, practically, throughout later life, taking many different medications, which often had a pronounced side effects, or even lead to irreversible changes in a relaxed and without of the body, even more aggravating for a chronic disease. At present, the whole spectrum of pathology is an area of application of functional neurosurgery.

Trigeminal neuralgia

Paroxysmal trigeminal neuralgia was first described in the XVIII century N.Abdre (1756), J.Fothergill (1776)

- Incidence: 4-5 cases per 100,000 population per year
- The prevalence of 30-50 cases per 100,000 population
- Women : Men = 2:1
- Most often occurs in people older than 50 years
Classification of TN (J.Eller, A.Roslan, 2005)

Allocated symptoms

IDIOPATHIC TN (acute, short-term type of electrical discharge episodic pain)
(Pain, throbbing, burning pain, more than 50% of the time a character constant)

TRIGEMINAL DAMAGE

Indirect (facial skull trauma, ENT surgery, surgery on the skull base and the PCF, stroke)
Immediate (neuroektomii, gangliolizis, rhizotomy, nucleotomy, tractotomy, or other denervating procedures)
Associated with multiple sclerosis
The resulting myocardial herpes zoster
Somatoform pain disorder (functional or psychotic)

Diagnostic classification

TN type I
Neuropathic pain
Deafferentation trigeminal pain
Symptomatic TN
Postherpetic TN
Atypical pain in the face

The classic criteria for TN (K.F.Casey, G.Weigel, 2000)

• Acute paroxysmal pain on one side of the face (in 97% of cases);
• Sudden remission and exacerbation of pain;
• Irradiation of pain in the areas of innervation of the branches of the trigeminal nerve (V2 and most V3);
• Lean neurological symptoms;
• The presence of distinct trigger zones;
• The effect of taking carbamazepine

Seizures and acute pain triggered by:

• Shaving;
• Washing;
• Brushing teeth;
• A gust of wind;
• Cosmetics;
• Smile;
• Touching the person, even a light;
• Articulation during speech

THEORIES OF TN

• Peripheral theory - defeat is localized in the root-zone a few millimeters at the entrance to the root bridge due to damage (thinning), myelin layer. This leads to chronic irritation of the nerve as a result of the depletion of segmental inhibition in the trigeminal nucleus and increased activity in the trigeminal nerve, causing ectopic action potentials;
• Central theory - irritation of the trigeminal nerve nuclei in the roots due to the unchanged susceptibility of nuclear forces the posterior horns of the spinal cord, the diencephalon, the thalamus and the cerebral cortex to maintain pathological pain stimuli;
• Notes the role of genetically susceptible weak analgesic system;
• Attack of pain is considered as an analogue of nuclear seizure
THE ETIOLOGY OF TN

- Vascular compression (86-97%);
- Arteries (80-97%);
- Veins;
- Tumors of the PCF;
- AVM basilar and cerebellar arteries;
- AVM vessels of the trunk;
- Congenital or acquired narrowing of channels and holes of the skull.

PHARMACOTHERAPY TN

- Carbamazepine (Tegretol, Finlepsin) 600-1200 mg / day;
- Baclofen 50-60 mg / day;
- Phenytoin (most supplements 1 and 2) 300-400mg/den;
- Gabapentin (Neyralgin) 900-1800 mg / day;
- Lamiktal (Lamotrigine) 300-500 mg / day

PHYSICAL TREATMENTS

1. Electrocautery and transcutaneous stimulation of the afferent fibers
2. Naproxin (Anrel, Anadrox, Iboral, Noludol) 1000-1200 mg / day
3. Analgesics, non-steroidal anti-inflammatory drugs (ibuprofen, ketoprofen, diclofenac);
4. Euthanasia

PHOTOTHERAPY TN

- Photodynamic therapy

TREATMENT OF POSTHERPETIC TN

- Antiviral therapy (Cycloferon, Zovirax);
- Epidural steroids in the Mekkelevu cavity (diprospan) and bupivacaine (Merkain);
- Amitriptillin and / or Gabapentin (Neyralgin);
- Vaccination;
- Intrathecal methylprednisolone

SURGICAL TREATMENT OF TN

1. Alcoholization and the blockade of the peripheral branches of TN;
2. Blockade of Gasser’s node;
3. Neyrotomy peripheral branches of TN;
4. Decompression of peripheral branches of TN;
5. Thermal destruction (cryo-, HF) Gasser’s node;
6. Balloon microcompression of Gasser’s node;
7. Microvascular decompression (surgery Jannetta);
8. Stereotactic surgery in the basal ganglia;
9. Stereotactic radiosurgery (Gamma Knife);
10. Electrical stimulation of the cerebral cortex

DESTRUCTION OF SENSITIVE ROOT GASSER NODE

1. Determination of trajectory to the foramen ovale due to scall landmarks;
2. Introduction cryotom in the Mekkel cavity through the foramen ovale;
3. X-ray control location of cryotom in the cranial cavity;
4. Dosage (selective prism) cryosurgery of Gasser’s node
Microvascular decompression (MVD)

PETER JEANNETTE - American neurosurgeon. In 1967 he developed and implemented the technology to the operation of the MVD. The operation of MVD named after him (the operation Jannetta). Produced more than 4400 operations MVD.

THE ADVANTAGES OF MVD (P. JANNETTA, 2004)
- Complete pain relief at once;
- The absence of loss of function of cranial nerves;
- The absence of mortality;
- Resistant result;
- Patogenetic intervention;
- Availability

Microvascular decompression (MVD)

Microphotograph of the main stage of the installation with Teflon gaskets (P. Jannetta, 2004)

Microvascular decompression (MVD)

Neurovascular conflict
After decompression

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Epilepsy - in Greek - "a sudden fall." The people are called - "epilepsy." Sometimes accompanied by a fall in screaming, convulsions, loss of consciousness, biting tongue, involuntary urination. Attack lasts 3-4 minutes, then the patient falls into a deep sleep. This is a severe form of disease. Frequency of attacks varies - from 1-2 times per year to 10-15 per day.

In developed countries the number of seizures ranged from 24 to 53 cases per one thousand people. In addition, these figures do not include one-time provoked seizures and febrile seizures in children. Each year, the recorded incidence of epilepsy, an average of 70 per 100 thousand people (in children 4.5-5 times higher than in the population). The number of patients with epilepsy on the planet is more than 40-50 million people in Ukraine - about 500 thousand people.
Looking at epilepsy as an incurable disease has been refuted by modern epidemiological studies that suggest that:
- 70% of patients after 5 years of adequate therapy did not have seizures in;
- 20% of patients coming long-term remission (2-5 years);
- 20-30% of patients suffering from epilepsy all his life.
Extratemporal resection

Hemispherectomy

Calotomía

Stimulation nervus vagus

STEREOTAXIS

«STEREOTACTIC» - "Moving in space" (Greek)

Determination of stereotaxy is a set of methods and calculations that allow using special instruments and methods of X-ray and functional control with high precision type electrode (cannula) into a predetermined depth of the structure of the brain or spinal cord to influence her with a diagnostic or therapeutic purposes

Modifications of the stereotaxic apparatus (frame)

Horsley-Clarke (1908)  Robert Heath (1952)

Leksell (1949)

Spiegel E., Wycis H. (1952)
Modifications of the stereotaxic apparatus (frameless)

Dr. Irving Cooper (1955)  David Fairman (1976)

Cosman-Roberts-Wells (Radionics)

Equipped with modern stereotactic operating

Cryotom

Stereotactic surgery using the standalone cryoprobe controlled computed tomography intraoperative electrophysiological monitoring
Talamotomy
• Parkinson’s Disease
• Essential tremor
• Tremor in MS

Palidotomy
• Parkinson’s Disease
• Tics Tourette’s
• Dystonia

Earlier calculations of the subcortical nuclei was performed using a solution of Omnipak ventriculography (layout of the subcortical nuclei)

Stereotactic Atlas of MRI

Stereotactic surgery under the supervision of CT SOMATOM Siemens
For the purpose of electrical stimulation of deep brain structures used implantable cerebral electrostimulators

Frameless navigation system
What is electrostimulation?

- The impact of electricity on slaboimpulsnogo structure of the peripheral and central nervous system

- Fundamental mechanisms of action of neurostimulation is still unknown

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Problems with the nerves
The nerve; compression; fire damage to the nerves; tumors of the nerves; damage to the brachial plexus; The defeat of the facial nerve

Methods of diagnosis
Clinical examination; Electromyography; Magnetic resonance imaging; X-rays

Methods of treating injuries and diseases of the nerves
Suture of nerve; Suture of nerve damage after a fire; neuritis; Decompression, moving into a new bed; reinnervation; Orthopedic surgery in irreparable damage to the nerves; removal of the tumor

Medical illustration of left wrist and hand showing carpel tunnel syndrome. The yellow lines represent the median nerve, the blue bands the tendons. Repetitive motion of the wrist and hand causes swelling, and the resulting compression of the nerve results in pain and sometimes nerve damage

• In the treatment of cubital syndrome;
• In the treatment of carpal syndrome;
• In the treatment of tarsal syndrome;
• In the treatment of the fibulyar syndrome
OSTEOCHONDROSIS OF THE SPINE

The normal anatomy of the spine

The main X-ray guidance

Spinal stenosis is a narrowing of the spinal canal
OSTEOCHONDROSIS OF THE SPINE

Discogenic compression of the spinal cord nerve root

Posterior-lateral disc herniation L4-L5 with compression of the spine (radikulooishemia)

Posterior-lateral disc herniation in the thoracic spine with compression and spinal cord (mieloradikulooishemia)

Stages of formation of hernias
MRI of the spine. Herniated disc L5-S1, L3-L4

- The circular protrusion
- The central protrusion
- The lateral protrusion

Disc prolapse

Herniation of sequestered
Herniation of sequestered Intact nerve root, with a central disc protrusion

Nerve root irritation

Displacement of nerve root

Nerve root compression

Coarse nerve root compression

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The normal vertebral canal

Sequestered herniated disc in the cervical spine with gross spinal cord compression

Laminotomy and discectomy
L4-5 Disc Herniation with Laminotomy and Discectomy (Discectomy)

L4-5 Microdiscectomy Procedure

Microdiscectomy

L4-5, L5-S1 Spinal Injuries with Subsequent Surgical Fusions

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Compression fractures in osteoporosis and vertebral hemangiomas

The modern method of treating abnormal (osteoporotic, hemangiomyt, metastatic), fractures of the spine through hardening acrylic cement

KYPHOPLASTY SURGERY

Stages of kyphoplasty surgery

Kyphoplasty for CT
**Spinal cervical arthroplasty**

**Spinal lumbar arthroplasty**

**Dosed spinal skeletal traction**

**Methods of external fixation of the cervical spine**

Wearing a neck brace (Busch-Schantz) in the treatment of pain in the neck and osteochondrosis of the cervical spine and cervical spine injury.

Wearing a neck brace (Philadelphia collar) for the treatment of stretched ligaments and joints injured neck.

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Wearing the extensor (extension) corset in the treatment of vertebral compression fractures

Alternative semi-rigid lumbosacral corset in the treatment of herniated disc and protrusion at the level of the lumbar spine

Methods of external fixation of thoracic and lumbar spine

THANK YOU!!!